DEP FACT SHEET

E10: Gasoline Blended with 10% Ethanol
E10 in Cars and Small Engines

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If you drive a car or run a small engine (such as lawnmower, ATV, weed whacker, chain saw, snowmobile, or snow blower), you may have questions about E10 gasoline. This fact sheet is designed to alert consumers to any possible problems associated with the use of E10 gasoline.

What is E10?

The term "E10" refers to a blend of 10% ethanol with 90% gasoline. Ethanol is an alcohol, and almost all of the ethanol produced in the United States is made from corn.

What brought E10 to Maine?

State law does *not* have a requirement to blend gasoline with ethanol. It's here for other reasons. One is the national desire for clean air. In many areas of the country, "oxygenates" such as ethanol have been added to improve the combustion of gasoline and reduce tailpipe emissions. E10 can be used to improve air quality even in areas where it is not required, such as Maine, by displacing a percentage of conventional gasoline.

Another reason E10 has come to Maine is the National Renewable Fuels Standard (RFS). In 2007, the federal Energy Independence and Security Act became law, setting the RFS for 2008 at 9 billion gallons — that means that 9 billion gallons of renewable fuels must be blended into the national gasoline supply this year. The RFS increases to 36 billion gallons in 2022. Since ethanol is the renewable fuel of choice, almost all of the renewable component required by the RFS will likely be ethanol. Consequently, even though Maine has no state RFS requirement, as of November 2008, all the Maine terminals that carry gasoline are distributing E10.

A third reason is market forces. Refiners that blend with ethanol receive a subsidy that amounts to approximately five cents per gallon. There is a strong business incentive to produce ethanol for fuel blending.

E10 in Cars

If the vehicle engine or fuel system is pre-1980, it may not be compatible with ethanol-blended gasoline. Questions regarding vehicle systems should be directed to the engine manufacturer.

The use of E10 in late model automobile engines is covered by all major automakers. Generally speaking, vehicle owners should not notice a difference in their vehicles' performance. However, there is up to a 3% loss in fuel economy from the use of E10 gasoline because it has less energy content.

One phenomenon to be alert to regarding ethanol-blended gasoline is the possibility of "phase separation" at facilities that have not properly maintained and inspected their tanks. Phase separation is caused by ethanol's affinity for water.

When phase separation occurs, the ethanol absorbs excess water until it separates from the gasoline. The gasoline then floats on top of this water/ethanol combination that sits in the bottom of the tank. Because the fuel dispensed from the tank into the vehicle comes from the bottom of the tank, if phase separation has occurred, the car will receive a mixture of ethanol and water instead of E10 gasoline. *This seldom occurs,* but if it does, engine problems will occur quickly, even as the car is leaving the pump. *Should this occur*, talk with the owner of the gas station or convenience store.

Finally, note that some gas stations outside of Maine offer E85 gasoline. It is a blend of 85% ethanol with 15% gasoline, and it should only be used in "flexible fuel" vehicles made to specifically run on the E85 blend or conventional gasoline.

E10 in Small Engines

Small engine manufacturers allow the use of E10, and small engine owners with questions about E10 compatibility should consult their owner's manuals or contact the engine manufacturer to identify any potential issues. Issues that have been identified thus far generally relate to pre-1980 models of boats, motorcycles, snowmobiles, ATVs, lawn and garden equipment, etc. For instance, certain types of rubber used in seals and hoses may deteriorate more rapidly when exposed to ethanol-blended gasoline. There have also been reports that gasoline containing ethanol may cause problems for boats manufactured in the mid-1980s and earlier with fiberglass gas tanks. The resin used in these tanks may be attacked by the ethanol, resulting in ignition problems and even tank failures. Owners of these boats should contact the boat manufacturer.

As for snowmobiles, some manufacturers recommend that, when using E10 gasoline, the carburetor main jet be one size larger than the main jet required for regular unleaded gasoline. For example, if a 400 main jet is recommended for regular unleaded gasoline, a 410 main jet must be installed if using an oxygenated gasoline like E10. The owner's manual will contain specific manufacturer recommendations.

In general, E10 has a greater affinity for water than conventional gasoline, and this may aggravate water and moisture problems in particular fuel storage or unused engine situations. If a problem already exists, then ethanol may make it worse. However, the manufacturer recommendations for storing fuel (either outside the gasoline tank attached to the engine or in it) are the same regardless of whether one is using conventional gasoline or E10. These include:

- Mixing only what's needed for two-cycle gasoline and oil mixtures;
- Not storing gasoline for more than 30 days unless a stabilizer (available at most hardware and small engine repair shops) has been added. When purchasing a fuel stabilizer it is important to ensure the stabilizer is compatible for use in gasoline containing ethanol (label may say gasohol); and
- Running the engine dry at the end of the season. (Note that unmixed "old" gas can be burned in your car by adding one part old fuel with five parts new fuel and that some towns sponsor household hazardous waste pick-up days that will accept old gasoline. Town offices will have this information.)

E10 and All Petroleum Products

With E10, as with all petroleum products, avoid use near wells and take every precaution to prevent spills on the ground or near any surface water. Even small amounts of gasoline of any type can contaminate soils, the ground water we drink and the waters of our lakes, rivers, streams and coastline that we enjoy.

For more information

Additional information can be found in the following publications and at the following websites.

Ethanol: Frequently Asked Questions
http://www.maine.gov/dep/air/mobile/faqs.htm
and
http://www.maine.gov/dep/air/mobile/ethanol.htm

Household Petroleum Use
Safe Home Brochure, Fact Sheet #7 available at
http://www.maine.gov/dep/blwq/docgw/shp7.pdf